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Technical Memorandum

King County Tabula: Task 3— Identify, Research, and Add New Unit Cost Components to Tabula for Reclaimed Water Distribution

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This memorandum pertains to revisions and updates to the King County Wastewater Treatment Division's Tabula cost estimating program, and specifically discusses Task 3: to identify, research, and add new unit cost components to Tabula for reclaimed water distribution.

Tabula currently calculates costs for pipes, parallel pipes, jack and bore, microtunnels, tunnels, horizontally drilled pipe, pump stations, and storage facilities. The County requested that the consultant add a new model for calculating the cost of reclaimed water (RW) distribution. The existing piping model was duplicated for RW distribution and modified to include smaller pipe diameters and additional meter costs. With the exception of the additional service meters, the per linear foot (LF) costs include all recommended isolation valves, line valves, backflow preventers, air gaps, and communication for control of valves.

For lines that are less than 12", the costs include one branch isolation valve and one line valve for each half-mile. For lines that are greater than or equal to 12" the cost includes one line valve for each half-mile.

Service point meter costs for lines less than or equal to 12" include one backflow preventer, one isolation valve, meter, and communication lines. Service point meter costs for lines greater than 12" include an air gap, a meter, an isolation valve, and communication lines. The default value for meter counts is zero and has no impact on cost unless a number greater than zero is entered.

All pipe materials are based on purple PVC up to 24". 30"- and 36"-diameter pipe is provided as part of the model but should be used cautiously because 30"- and 36"-diameter PVC is not available. Our cost estimators reviewed the possibility of using ductile iron but found it to be cost-prohibitive. For this model, the 30"- and 36"-diameter pipes use an escalated cost. All costs should be reviewed thoroughly.

The overall cost for RW systems is calculated using the same equations as the piping model plus the service point meter costs and is based on the data from Tables 3.1–3.4 below.

Table 3.1. RW Pipe Material and Installation Costs		
Pipe Diameter (in.)	Recommended RW Material Cost ($/LF)	Recommended RW Install Cost ($/LF)
2	$1	$6
4	$2	$7
6	$4	$14
8	$7	$26
10	$11	$27
12	$15	$29
14	$21	$30
16	$27	$31
18	$33	$32
20	$41	$34
24	$59	$37

Table 3.2. RW Service Point Meter Costs		
Pipe Diameter Range (in.)	Meter Diameter	Recommended Service Point Base Cost ($/each) (Oct. 2008 Dollars)
2	2	$2,852
4–6	4	$6,695
8	6	$29,244
10–12	8	$32,639
14	10	$36,054
16–18	12	$39,650
20–24	16	$48,033

Table 3.3. RW Traffic Control Costs		
Pipe Diameter Range (in.)	Recommended Average Traffic Control Cost ($/LF) (Sept. 2008 Dollars)	Recommended Heavy Traffic Control Cost ($/LF) (Sept. 2008 Dollars)
2–6	$4	$8
8–21	$8	$16
24	$12	$24

Table 3.4. RW Utility Conflicts		
Pipe Diameter Range (in.)	Recommended Average Conflict Cost ($/LF) (Oct. 2008 Dollars)	Recommended Complex Conflict Cost ($/LF) (Oct. 2008 Dollars)
2–6	$2	$24
8–12	$3	$32
14–18	$3	$42
20–24	$5	$58